

Application No.: 09/889,269
Attorney Docket No.: FUK-84
Amendment Dated: 22 September 2005
Reply for Office Action Dated: 2 June 2005

REMARKS

Claims 2 and 5-12 are pending in the application. Claims 1, 3, and 4 have been previously cancelled.

Claims 5-9 are amended herein. No new matter is added by the claim amendments. The claim amendments are fully supported by the original disclosure, e.g., Page 3, line 22 to Page 4, line 7; Page 5, line 21 to Page 6, line 11 of the substitute specification filed 13 July 2001.

Claims 2, 5-9, and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 4,507,339 to Carbo et al. ("Carbo") in view of U.S. Patent No. 4,248,676 to Uchida et al. ("Uchida").

Regarding base Claim 5, for example, the rejection reads as follows in relevant part:

Carbo discloses a structure comprising a metallic material with a matte surface (*col. 4, lines 64-67*) and a chromium-oxide passivation film (*chromium/chromium oxide surface treatment*) disposed on the metallic material surface (*col. 2, lines 20-23*). (Office Action at Page 2, ¶5).

However, the "chromium/chromium oxide surface treatment" relied upon by the Examiner is not an independent process that can be freely applied to any base material, such as the "matte-finish, electrolytic tinplate" referenced by the Examiner. Rather, the referenced "chromium/chromium oxide surface treatment" of Carbo is associated solely and exclusively with the tin-free steel, i.e., the treatment is a defining and constitutive part of what makes a structure tin-free steel. The context for using the treatment is only tin-free steel and nothing else. In particular, tin-free steel, by definition, is formed by this treatment, i.e., "tin-free steel ... is ... steel with a chromium/chromium oxide surface treatment." Carbo hence does not disclose that the "chromium/chromium oxide surface treatment" of tin-free steel is (or can be) combined with

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the matte surface material. (As discussed below, Applicant has furnished a Supplemental IDS furnishing documents describing the details of the "chromium/chromium oxide surface treatment" that is embodied within tin-free steel.)

In the passages cited by the Examiner, Carbo teaches that the starting material for purposes of practicing the Carbo invention (i.e., providing a resin coating) is either the tin-free steel (which has the "chromium/chromium oxide surface treatment") or the "matte-finish, electrolytic tinplate." The "chromium/chromium oxide surface treatment" of Carbo is itself not a process available for application to other base materials (at least according to Carbo), but is limited (and restricted) to its use as a constituent part of the tin-free steel fabrication. Thus, the structural combination proposed by the Examiner -- namely, the matte-finish material and the "chromium/chromium oxide surface treatment" belonging to tin-free steel -- is not disclosed by Carbo.

In view of the foregoing, Applicant respectfully requests that the rejection be withdrawn.

Nevertheless, notwithstanding the above, Applicant believes that the "chromium/chromium oxide surface treatment" of Carbo does not satisfy the relevant claim limitations. Applicant believes that this determination stands regardless of whether the "chromium/chromium oxide surface treatment" pertains to tin-free steel (as Carbo discloses) or pertains to any other base material such as the "metallic material with a matte surface" of Carbo (as in the combination proposed by the Examiner). As discussed below, the "chromium/chromium oxide surface treatment" associated with tin-free steel involves a chromium-only layer placed directly on the metal surface, followed by a chromium-oxide layer placed on the underlying chromium-only layer. By comparison, in the invention, the chromium-

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oxide coat is deposited directly on the metal surface. This direct-deposit feature, in combination with the feature directed to the metal surface having a surface roughness (Ra) being not more than 1.5 μ m, provides improved adhesion of the passivation film (chromium-oxide) to the metal surface, which is an unexpected improvement not taught or suggested by the art.

Base claims 5-9 have been amended.

Referring to amended base Claim 5, for example, the chromium-oxide passivation film consists of an oxidized chromium coat deposited directly on the metallic material surface.

The rejection relies upon the following disclosure from Carbo to purportedly satisfy the various claim limitations concerning the chromium-oxide passivation film:

The tin-free steel preferred for use in the present invention is aluminum-killed, continuous cast steel with a chromium/chromium oxide surface treatment. The chromium in the oxide is present at about 0.5 to 2.0 mg per square feet and the chromium metal at about 3 to 13 mg per square foot. The material described is known in the art as TFS-CT for tin-free steel, chromium type. (Col. 2, lines 20-27). (Emphasis added.)

In the Supplemental Information Disclosure Statement filed herewith, Applicant has cited various patent documents describing in more detail the "chromium/chromium oxide surface treatment" referenced as TFS-CT (tin-free steel, chromium type) in Carbo. Unlike the invention, where the oxidized chromium coat is deposited directly on the metal surface, the TFS treatment of Carbo involves a strictly chromium layer deposited directly on the metal surface and a chromium-oxide layer deposited on the chromium-only layer. Thus, the "chromium/chromium oxide surface treatment" relied upon in the rejection does not provide a passivation film consisting of chromium-oxide deposited directly on the metal surface.

The following disclosures are noted from the Supplemental IDS (emphasis added).

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U.S. Patent No. 6,331,241 to Ilgar:

In the American steel industry, low carbon sheet steel thinly plated with chromium is generally referred to as tin free steel ("TFS"). In Europe and Asia, the same type of product is more commonly called electrolytically chromium coated steel ("ECCS"). ... In the manufacture of TFS, the sheet steel is utilized as the cathode in an electrolytic cell for the solution, power is applied, and a coating of chromium metal is formed on the sheet steel. Typically, the finished product will have a layer of 3 to 13 milligrams per square foot of metallic chromium (a common target is 5 mg/ft²) and will have a layer of about 0.5 to 1.5 mg/ft² chromium oxide on top of the metallic chromium. (Col. 1, lines 10-29.)

U.S. Patent No. 5,686,194 to Shimizu et al.:

The two-piece cans are generally DRD (drawn and redrawn can) and DWI (drawn and wall ironed can) produced from tin plated steel sheet, aluminium sheet, aluminium alloy sheet or ECCS (electrolytically chromium coated steel), and DTR (drawn thin-redrawn can) is recently put to practical use. (Col. 1, lines 13-18.)

In the present invention, as shown in FIG. 1, a steel sheet 1, covered with a layer 3 composed of an upper layer of hydrated chromium oxide and a lower layer of metallic chromium, of which both sides are laminated with a thermoplastic resin 2 coated on the one side of it with a lubricant 4 which volatilizes at a high temperature, has to be reduced to a thin gauge by dry forming with a high reduction ratio. (Col. 3, lines 46-52.)

As shown in FIG. 1 a steel sheet 1 to be laminated with a thermoplastic resin 2 is preferably ECCS having a double layered film 3 composed of an upper layer of hydrated chromium oxide of 5 to 25 mg/m² and a lower layer of metallic chromium of 30 to 200 mg/m². (Col. 8, lines 62-66.)

U.S. Patent No. 5,298,149 to Kawamura et al.:

The present invention relates to a copolyester resin film laminated steel sheet having double layers consisting of a lower layer of metallic chromium and an upper layer of hydrated chromium oxide (TFS film) on a tin plated steel sheet which is characterized by the state of plated tin, ... (Col. 1, lines 15-20.)

(4) A surface of tin plated steel sheet having features of (1) to (3) described above is uniformly covered with TFS film consisting of a lower layer of metallic chromium and an upper layer of hydrated chromium oxide; ... (Col. 3, line 66 to Col. 4, line 2.)

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The tin plated steel sheet produced under the conditions described above is covered with TFS film. For the formation of said TFS film on the tin plated steel sheet, the following two methods which are used for the production of TFS are utilized:

- 1) The one is a two-step process in which metallic chromium is plated and then hydrated chromium oxide is formed on the metallic chromium layer.
- 2) The other is one-step process in which said TFS film is simultaneously formed on the tin plated steel sheet. However, the one step process has merit with a view to use of less equipment. (Col. 5, lines 54-65.)

In view of the foregoing disclosures, it is clear that the TFS "chromium/chromium oxide surface treatment" of Carbo does not result in a structure that satisfies the claim limitations directed to a chromium-oxide passivation film consisting of an oxidized chromium coat deposited directly on the metallic material surface, as set forth in Claim 5 (as amended).

The TFS treatment of Carbo does not result in a structure where the passivation film consists of an oxidized chromium coat deposited directly on the metallic material surface. Rather, according to the TFS treatment, a layer made exclusively and only of chromium is first deposited directly on the steel surface, followed by the chromium oxide layer being deposited on the chromium-only layer. Accordingly, in Carbo, there is no passivation film consisting of an oxidized chromium coat deposited directly on the metallic material surface.

Uchida does not cure or overcome the noted deficiencies of Carbo.

For the foregoing reasons, Applicant submits that the subject matter of base Claim 5 (as amended) is not taught or suggested by Carbo in view of Uchida. Similarly, Applicant submits that the subject matter of base Claims 6-9 (as amended) likewise is not taught or suggested by Carbo in view of Uchida, for reasons similar to those discussed above in connection with Claim 5.

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In view of the foregoing, Applicant respectfully submits that Claims 2, 5-9, and 12 are patentable over Carbo in view of Uchida, and requests that this rejection be withdrawn.

Claims 10 and 12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Carbo in view of Uchida as applied above, and further in view of U.S. Patent No. 5,656,099 to Ohmi.

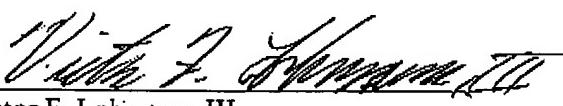
Applicant respectfully submits that Claims 10 and 12 are patentable over Carbo in view of Uchida and Ohmi as depending from patentably distinguishable base Claim 9, and requests that this rejection be withdrawn.

Applicant believes that the application is in condition for allowance and respectfully requests favorable action in accordance therewith.

The Hon. Commissioner is hereby authorized to debit any fees and/or credit any overpayments to the undersigned's deposit account, RANDALL J. KNUTH, P.C., account no. 501157.

If the Examiner has any questions or comments that would advance prosecution of this case, the Examiner is invited to call the undersigned at 260/484-4526.

Respectfully Submitted,


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RJK/jrw2

Enclosures: Amendments to the Claims (3 Sheets)
Explanatory Cover Sheet - Page 1
Petition for Extension of Time
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CERTIFICATE OF MAILING

I hereby certify that this correspondence is being deposited with the U.S. Postal Service as first class mail in an envelope addressed to: Commissioner for Patents, PO Box 1450, Alexandria, VA 22313-1450, on: September 22, 2005.


Victor F. Lohmann, III, Registration No. 33,951
September 22, 2005

Date